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## *On the Eclipse and Transits of Jupiter's Satellites, 21st August*, 1867. By C. H. Weston.

During the unusual phenomena which occurred on the evening of the 21st of August, some points of interest attracted my attention, which I beg to lay before our Society.

A bright eastern bank of clouds in the otherwise clear sky obscured the early observations of the satellites. But the night was fine and clear, and the definition of *Jupiter* exceedingly good.

On this occasion I used a 9-inch Newtonian reflector, with a non-inverting pancratic eye-piece.

The contact and separation of the satellites was exquisite, from the first protruding interruption of the primary's periphery, to the bead-like form just touching, and finally their excision by the thread-like line of sky.

When all the three satellites were *in transitu* the shadow of the third was distinctly seen to be larger than the fourth, and the first the smallest of the three. This was perceptible to an observer who knew not that this was exactly in accordance with the relative size of the satellites.

The belts of *Jupiter* also were well exhibited: the two equatorial as the darkest; the Polar cap (extending some way down to the light band) in more delicate shade, while the corresponding Antarctic region was broken up into a smaller cap of a similar lighter colour, and a stratum of cloud intervening between it and the great southern light band.

Soon after the commencement of the transit of the third satellite on the eastern disk of the planet (but subsequent to the eclipse of the second on the western edge), I noticed two spots instead of one, and had not the first and fourth been still at a distance to the east of *Jupiter* I should have considered that two satellites (instead of one) were traversing the primary. This duplicity soon afterwards ceased to be visible.

When, however, all three satellites were together passing over *Jupiter* (with the fourth far in advance of the first), the phenomenon was again observed with respect to the first, and for a much longer period.

While the first was passing along (and just above) the lower equatorial belt, another dark spot followed it below the same belt. This lower spot, however, was visibly smaller than the upper one, and I think I recollect that their relative positions altered during the transit. When the transit was reached half way across the planet, the spots were not so decidedly seen (owing, doubtless, to the great rotundity of *Jupiter's* equatorial regions), and gradually became indiscernible.

But on the egress of the transit of this the first moon, it became evident which was the substance and which the shadow. I found that the upper one (and not the lower) was

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the real satellite which had indeed overtaken and left the fourth still on *Jupiter's* disk.

I did not remark any duplicity connected with the fourth satellite; but it may be worth observing that the paths of the first and third across their primary were not very dissimilar (above and partly on the upper portion of the great southern dark belt), while that of the fourth was along the lower part of the same belt.

The transits of the first and second satellites of *Jupiter* were observed on the evening of the 16th of September. The passage of the first satellite was scrutinised for some way on the primary's disk, *but the shadow never at this transit assumed that remarkable duplicity* which it presented on the 21st August as described above.

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## *On the partial Lunar Eclipse,* 13*th Sept.* 1867.

### By C. H. Weston.

There were a few points of interest connected with the lunar eclipse which may deserve a passing notice.

Firstly. Respecting colour of parts eclipsed; the prevailing colours were red-bluish and grey and grey. The redness increased towards the *darkened edge* of the Moon.

I did not (as in former eclipses) notice this colour at the boundary line where the Earth's shadow impinges on the Moon; but, on the contrary, it was confined to the *opposite* eclipsed region, deepening as it approached the northern parts, and attaining its greatest depth at the Moon's periphery. This was strikingly observable when the eclipsed portion was alone in the field of view. That these effects did not result from any chromatic errors was proved by using different telescopes and powers.

These colours and their relative positions differed entirely from those presented in the partial eclipse of Feb. 1858.

Secondly. Even during the eclipse *Aristarchus* exhibited its characteristic (though modified) *resplendent whiteness* which contrasted remarkably with the general gloom of the lunar surface. The details of the Moon were beautifully visible during the various gradations of the eclipse shadow.

Thirdly. The illuminated part of the Moon showed well its broken periphery in the mountainous tract of the S. E., S., and S. W.

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*Lansdowne, Bath, Sept.* 16, 1867.

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